

## CLAIMS

1. A transmission device conducting communication with predetermined quality ensured, comprising:
  - 5 a classification unit (102) classifying a packet of data to be transmitted according to each packet header,
  - a determination unit (106) organizing a set of packets having the same packet header as a packet group according to a classified result by said classification unit (102), and determining whether to be transmitted with a bandwidth guaranteed according to a bit rate of the packet group, and
  - 10 a request unit (107) requesting a bandwidth control device to reserve a bandwidth for a packet group determined to be transmitted with a bandwidth guaranteed by said determination unit (106).
- 15 2. The transmission device according to claim 1, wherein said determination unit (106) comprises
  - a measurement unit (141) measuring the bit rate per predetermined unit time of said packet group,
  - 20 a calculation unit (142) calculating a parameter representing variation in the bit rate with a latest predetermined number of data to be a subject from a measured result by said measurement unit (141), and
  - a packet determination unit (143) determining that the packet group is a packet group to be transmitted with a bandwidth guaranteed when the parameter calculated by said calculation unit (142) is at most a preset value.

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3. The transmission device according to claim 2, wherein said calculation unit (142) increases the number of data to be the subject of

calculation when the calculated parameter is larger than a preset value and recalculates the parameter, and

said packet determination unit (143) determines that the packet group is the packet group to be transmitted with a bandwidth guaranteed when a value of said recalculated parameter is at most the preset value.

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4. The transmission device according to claim 2, wherein said calculation unit (102) repeats calculation of the parameter until the parameter becomes at most the preset value, or said number of data to be the subject becomes a maximum that is determined in advance, while sequentially increasing the number of data to be the subject.

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5. A transmission device conducting communication with predetermined quality ensured, comprising:

a classification unit (102) classifying a packet of data to be transmitted according to each packet header,

15 a determination unit (106) organizing a set of packets having the same packet header as a packet group according to a classified result by said classification unit (102), and determining whether to transmit with a bandwidth of said packet group ensured, and

20 a request unit (107) requesting a bandwidth control device to reserve a bandwidth for a packet group,

wherein said determination unit (106) calculates a buffer capacity required when a packet group is to be transmitted in a specific bandwidth, performing the calculation with the bandwidth changed, deriving a relationship between a required bandwidth and a required buffer capacity, and determining whether the packet group is a packet group to be transmitted with a bandwidth guaranteed from said relationship.

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6. The transmission device according to claim 5, wherein said determination unit (106) extracts a maximum value of the buffer capacity required for each requested

bandwidth, and determines whether the packet group is a packet group to be transmitted with a bandwidth guaranteed depending upon whether a graph representing a relationship between a requested bandwidth and the maximum value of the required buffer capacity is within a predetermined region or not.

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7. The transmission device according to claim 6, wherein said determination unit (106) causes said request unit (107) to request a bandwidth in said predetermined region, and requests a buffer unit (110) to ensure the maximum value of the buffer capacity in said predetermined region.

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8. The transmission device according to claim 7, wherein said determination unit (106) determines the bandwidth to be requested and the buffer capacity to be ensured such that a total cost is minimized based on a cost required to ensure the bandwidth and a cost of the buffer capacity.

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9. The transmission device according to claim 1, wherein, when determination is made by said determination unit (106) that a packet group once determined to be transmitted with a bandwidth guaranteed is not observed for a predetermined time and is no longer necessary to ensure the bandwidth, said request unit (107) requests said bandwidth control device to release the bandwidth guaranteed for the packet group.

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10. The transmission device according to claim 1, wherein, when there is a change of at least a predetermined criterion in characteristics of a bit rate of a packet group once determined to be transmitted with a bandwidth guaranteed by said determination unit (106), said request unit (107) requests said bandwidth control device to modify the bit rate of the bandwidth guaranteed for the packet group to the latest value.

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11. The transmission device according to claim 1, wherein, when there is a  
change of at least a predetermined criterion in characteristics of a bit rate of a packet  
group once determined to be transmitted with a bandwidth guaranteed by said  
determination unit (106), said request unit (107) requests said bandwidth control device  
5 to release the bandwidth guaranteed for said packet group.